Name:
Group:

English Test January 2016 /20

S1B-S1D

1- What is cryptography ? What does « Caesar Cipher » consist of ? /02

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2- Who was Alan Turing ? What did he do that made him famous ? /03

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3- Read the following text and answer the questions :

Patent records reveal that the way inventions are made has changed over the years

Apr 25th 2015 | From the print edition of The Economist

IN THE 19th century, inventors were heroes. The likes of Stephenson, Morse and Goodyear were the shock troops of the Industrial Revolution. Their ideas helped drag humanity from agrarian poverty to manufactured plenty. These days, though, inventor-superstars, while not absent, are fewer and farther between.

That may, in part, be because the process of invention has itself changed since the 19th century. There is no let-up in the growth of the number of patents issued each year, but the introduction of fundamentally new classes of technology seems rarer now than it was in the past. Information Technology has certainly transformed the present day. But railways, the electric telegraph, photography, fixed-line telephony, the automobile and the chemical and steel industries each, separately, brought about transformations as big as anything IT has wrought so far. Perhaps the process of invention really was more heroic in Victorian times.

To have an impression that something has changed is not, however, to prove that it really has. For that you need data. And, in a paper just published in the *Journal of the Royal Society Interface*, Youn Hyejin of Oxford University and her colleagues have provided some.

Invention can come about in two ways. Thomas Edison's light bulb, for example, was not so much the product of a metaphorical light-bulb moment of discovery as of the bringing together of pre-existing components—an electricity supply, a heated filament, a vacuum and a glass envelope. None of these things was novel in the 1870s, but in Edison's hands the combination became a patentable invention. In contrast, William Shockley's transistor, invented 70 years later, involved a lot of new physics that Shockley and his colleagues had to work out for themselves. Both devices changed the world, though (Shockley's was the foundation on which IT was built). And together they exemplify the two sorts of novelty that exist, in differing proportions, in any successful invention: discovery and recombination.

Dr Youn has looked at the balance between these things, and how it may have changed. She drew her data from the United States Patent and Trademark Office (USPTO)—not a perfect indicator of inventiveness, but probably a fair proxy for it. The authorities there sort patent documents into groups based on common

subject matter. To do so, they classify the various technologies responsible for an invention's novelty using an elaborate arrangement of codes.

Each subject grouping in USPTO's scheme includes a major component called a class and a minor one called a subclass. A class distinguishes one technology from another. Subclasses delineate processes, structural features and functional features of the technology in that particular class. A class-subclass pair—say, 136/206 for class 136 (batteries: thermoelectric and photoelectric) and subclass 206 (solar energy type)—is a unique code, and every patent is identified by at least one such code. The office has records of these codes going back to 1790. Overall, those records cover 474 classes and more than 160,000 codes. Only when a patent proposal arrives that cannot be slotted into the existing classification is a new one created.

When Dr Youn and her colleagues examined the patent office's files they found that nearly half the patents issued by the United States during the 19th century were for single-code inventions. These days, by contrast, nine-tenths are for inventions that combine at least two codes. The number of codes and the number of patents both grew exponentially, at the same rate, until the 1870s (about the time of Edison's light bulb; see chart). After that, the growth rate of new codes fell off dramatically, and that of new patents slightly. The introduction of new combinations of codes has, however, continued to expand in step with the number of patents awarded. That suggests invention now proceeds mainly by recombining existing technologies and chimes with the idea that inventions were, in some sense, more fundamental in the past than they are today.

This combinatorial explosion no doubt partly reflects the fact that the number of possible combinations grows faster than the number of codes they are based on. But that it has actually happened had not, previously, been demonstrated.

What remains to be seen is whether biotechnology will change things. Most inventions up until now have been based on physics or chemistry. Today's understanding of biology, though, is roughly where that of the physical sciences was in the 19th century. Biology is therefore ripe to yield a clutch of new patent classes—possibly for things (neurological computers? furniture grown from seed?) as unimaginable to present-day folk as the telephone would have been to a soldier at the battle of Waterloo. Then, perhaps, a new generation of heroic inventors will emerge.

Patent= brevet

1- According to the text, are there more inventions today or in the past ? Explain why ? /03

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2-What are the 2 ways inventions can be created ? /02

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3- According to Doctor Youn, why are inventions of the past more fundamental than today ?/02

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4- How can it change ?/02

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3- You are the inventor of one of these inventions : Write several paragraphs presenting your object to a group of experts (include technical specifications , « how it works » , safety and precautions, advantages and drawbaks and future improvements. /06

A- The laser keyboard

B- How to charge your phone using the hot or cool temperatures your drink gives off

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